POLICY INTEGRATION: ENVIRONMENT AND DEVELOPMENT IN ASIA

David P. Angel,
Laskoff Professor
Clark University
Worcester, MA, USA
e-mail dangel@clarku.edu

And

Michael T. Rock,
Professor of Economics
Hood College
Frederick, MD USA
e-mail: rock@hood.edu

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Abstract

For the twin goals of environmental improvement and poverty reduction to be met within developing Asia there is a need for greater pro-active management of the economy-environment interface than occurs under existing policy approaches. Many observers are now calling for policy integration – for the internalization of environmental concerns within core economic development strategies and policies. Significant obstacles exist to the adoption and implementation of effective systems of environmental protection within developing Asia, including weak and under-resourced institutions of environmental regulation, and a shortage of political will to implement necessary reforms. Policy integration appears to offer a way forward to overcome these obstacles. In this paper, we examine policy integration as a way of enhancing environmental protection by more closely aligning efforts to improve environmental quality and economic performance within developing Asian economies. We draw upon the experience of East Asian Newly Industrializing Economies to provide practical examples of policy integration in action. We draw out the implications of the East Asian experience for other developing countries within the Asia Pacific region and explore ways in which organizations of environmental protection and economic development can work together without compromising their individual autonomy.

I. Introduction

1. The state of the environment in developing Asia is now well documented (ADB 2001; UNEP 1999; UNESCAP 2000). From unhealthy air and poor water quality, to soil erosion, desertification, scarcity of freshwater, climate change, loss of forest cover, loss of bio-diversity, and degradation of coastal resources, the region faces a litany of environmental and resource problems. Analysis of these environmental problems during the 1990s led many to conclude that poor environmental quality in developing Asia was a failure, above all, of policy and of institutions (ADB 1997). Weak institutions, ineffective and inefficient policy tools, and lack of support for the consistent pursuit of environmental goals accentuated a deficit of capacity and a deficit of will.

2. We believe this diagnosis is broadly correct. The experience over the past three decades of the newly industrializing economies of East Asia suggests that where environmental regulatory systems have been strengthened, the result has in most cases been a reduction in pollution, land degradation and other environmentally damaging processes. This in turn has produced improvements in certain measures of environmental quality. Much remains to be done. The primary focus has been on reducing air and water pollution; far less attention has been paid to reducing energy, materials and resource use. Difficult environmental problems persist, most especially the rapid growth in greenhouse gas emissions, as well as trans-boundary air pollution. Many perverse subsidies remain and existing resource and pollution charges do not come close to covering the full environmental costs of economic activity. Small firms and unregistered enterprises continue to elude effective regulation in many places. But from Japan to Malaysia (Rock, 2001a), Korea (Aden, Kyu-Hong and Rock, 1999) and Singapore (Rock, 2001b) to Taiwan, China (Rock, 1996) where well designed environmental policies have been put in place and consistently implemented, the result has been improvement in environmental performance.

3. Building on this experience, many countries within the region – with support from the multilateral community - have outlined plans to implement and enforce stronger environmental policies and to commit additional resources to institutions of environmental regulation. Some progress has been made. Unfortunately, the pace of change in environmental policy in many countries has been desperately slow. In some countries, landmark environmental legislation goes unimplemented. Far too often, countries have adopted world class standards and requirements without putting in place operational programs that evaluate compliance and impose sanctions on those who fail to comply with environmental regulations. In other countries, the resources available for policy implementation do not come close to what is required. Where environmental regulatory agencies lack authority and resources, and policy enforcement is uneven, environmental degradation continues apace. Under conditions of rapid urban-industrial led economic growth, incremental improvements in environmental policy tend to be over-ridden by the scale effects of increased production, consumption and resource use (Angel and Rock 2000). Absent new

policy approaches, the state of the environment is likely to decline further within the lower income economies within developing Asia, and environmental degradation is likely to become an increasing constraint on future economic growth and upon efforts to eliminate severe poverty within the region (UNESCAP 2000).

4. What is happening? There is certainly no shortage of good advice on steps developing countries in Asia can take now to curtail pollution, land degradation and other environmentally damaging processes. Blueprints are written and plans abound. In practice, however, much of developing Asia is caught in the grip of three powerful obstacles to the widespread adoption of stronger and more effective environmental policy. The first obstacle is that of weak institutions of environmental policy that lack the resources, information, capacity and mandate for the formulation and implementation of policy. In too many cases, the institutions of environmental regulation continue to come second to more powerful private and public institutions of economic development. Second, institutional and policy weaknesses mean that the costs of abatement are unnecessarily high and tend to favor short-term responses over longer-term preventative strategies. Policy tools that fail to consider the economic costs of compliance often result in unattainable environmental goals, the presence of which only further undermines a weak culture of compliance. Third, the drivers of pro-environmental reform remain weak. Elevated mortality and ill health, and increasing resource constraints on sustainable livelihoods, somehow do not translate into recognized demands for environmental policy reform.[1] Absent continuing public activism and support, it is all the more difficult for elected officials to demonstrate the leadership and political will needed to strengthen systems of environmental protection.

5. What can be done to overcome these obstacles? For a growing number of researchers and policy makers, the key to widespread and rapid adoption of effective systems of environmental regulation in developing Asia is policy integration. At the most general level, policy integration means the internalization of environmental concerns into the core of economic development strategies and policies. Specifically, policy integration entails the adoption of institutional arrangements and policy tools that allow economic actors – firms, farms, and households – to respond positively to pressures for enhanced environmental performance. Rather than addressing environmental performance exclusively through the external pressure of a freestanding environmental agency, policy integration seeks to internalize environmental considerations within the basic economic decision making of firms and industries, and within the policies of the economic development agencies that bear primary responsibility for promoting industrial and urban growth. More generally, policy integration seeks to mobilize powerful forces of change within an increasingly globalized economy – information, capital, and technology – to the twin goals of reducing poverty and improving the state of the environment.

6. Effectively pursued, policy integration lowers the marginal cost of driving down the energy, materials, pollution and resource intensity of economic activity.

[1] For a concrete example, see Rock (2001a).

Inefficiencies associated with lack of information, lack of capital, lack of appropriate managerial and technical skills as well as perverse subsidies and incentives are addressed, resulting in changes in products and production processes that reduce both cost and environmental impact. Absent such real, identifiable and realizable opportunities for enhanced environmental and economic performance, increased pressure for change will raise costs rather that stimulate innovation. Indeed it is fair to say that absent a framework of policy integration, broad and sustained societal support for environmental improvement remains in doubt in developing Asia – notwithstanding the severe environmental problems facing the region today.

7. If this is the positive prospect of policy integration, it is important that we address two commonly voiced doubts about such policies. Organizations of environmental regulation and economic development, it is often suggested, have an inherent conflict of interest – between protecting the environment and promoting economic growth; policy integration potentially compromises the necessary autonomy of each organization in pursuing these policy mandates. In addition, the weak track record of cooperation among government agencies within many developing Asian countries is also a source of concern for policy integration. In this paper we explore ways in which the autonomy of cooperating institutions can be maintained. More importantly, we identify situations in which the goals of economic development and environmental protection are mutually reinforcing, rather than in opposition. Our analysis suggests that strategies that improve the overall economic efficiency of firms – such as upgrading managerial and technological capability and providing enhanced access to capital and to leading-edge technology – also yield important environmental benefit. This is the essence of clean production.

8. Various entry points for policy integration have been identified, ranging from the decision making processes of individual firms to intra- and inter-sectoral policy integration, coordinating industrial and urban policy, energy demand and energy supply (ADB 2001). These entry points also extend to the international scale through trade agreements, the WTO and other institutions of international governance. But to date there have been few good examples of policy integration in action. Without clear examples of successful policy integration, policy makers will be loath to invest in this emerging policy framework. It will remain a good idea and nothing more.

9. Policy makers in developing Asia need clear examples of policy integration in practice. This paper responds to the challenge for practical examples, and more generally, for models of policy integration in action. Traditionally policy analysts have looked to the OECD for models of successful environmental policy innovation. In the case of policy integration, however, the experience of OECD economies is hardly a good match. At the time when most OECD economies moved to strengthen systems of environmental protection, the challenge was that of improving the environmental performance of a mature industrial capital stock in the context of relatively high standards of socio-economic welfare. In much of developing Asia, by contrast, economies are undergoing very rapid industrial and urban growth, and this is occurring in the context of a compelling need to eradicate severe poverty.

10. On this account, we look to the experience of the East Asian NIEs for approaches taken to improving environmental regulatory systems under conditions of rapid growth, and where a country faces multiple potentially competing societal priorities, including improved environmental quality, reducing poverty, and promoting export-led industrial growth. Specifically, we examine approaches taken in Taiwan, China, Singapore, the People's Republic of China (PRC), and Malaysia toward controlling industrial pollution. In various ways each of these economies has gone beyond freestanding environmental agencies in addressing problems of industrial pollution. Each economy has begun to implement aspects of policy integration – partially and unevenly – to be sure. The lessons learned from the experience of East Asian NIEs in controlling industrial pollution form the basis for a recommended approach to policy integration in developing Asia.

11. We draw four lessons from the East Asian experience. The success of first tier East Asian NIEs in implementing strong systems of environmental regulation is based in part on:

- **Harnessing the capacities of strong institutions**: if traditional environmental institutions are weak, policy makers must make the link to other more powerful agents of change, including Ministries of Industry and Technology, research institutes, multinational firms, and urban mayors. Continuous environmental improvement driven by nascent national environmental agencies alone runs the risk of opposition from powerful economic development agencies and by the private sectors they promote. Lack of integration with other economic agencies also deprives environmental regulators of the critical information needed to drive down marginal costs of abatement and the energy, water, and materials intensities of production.

- **Reducing abatement costs**: governments, publics and private sectors in Asia are unlikely to support continuous environmental improvement if it comes at the cost of poverty reduction, increasing incomes, diversifying economies, expanding export bases, and upgrading the technical capabilities of private sector firms. The key to success of environmental policy reform in developing Asia will be the creation of policy frameworks that allow firms, farms, and households to make necessary changes without incurring unmanageable cost. Reducing abatement costs is thus a critical policy priority. The capacity to respond positively to new market and public pressures for environmental improvement cannot be presumed.

- **Effective leadership**: government agencies and other organizations need strong leadership with the capability to identify and seize targets of opportunity and to mobilize public support for their programs. Such leadership must extend to finding ways to embed goals within individual organizations (through merit-based and goal driven bureaucracies) and for finding common ground and negotiated consensus with other organizations.

- **Adopting an information-centered approach** to strengthening drivers of environmental improvement: sustained improvement in environmental performance will require strong public support for environmental improvement. The key to actualizing such support in Asia over the next decade is information: low cost, transparent, and widely shared information on the economic and health impacts of environmentally damaging processes of production and consumption.

12. In the remainder of the paper, we describe in more detail the strategies pursued in East Asia to create a context within which an effective system of environmental protection could be adopted and implemented. We then draw out a series of more general, practical recommendations for moving toward policy integration. It is important to note in this regard that the experience of East Asia is not directly transferable to other Asian countries. The strong development state harnessed to the cause of policy integration is hardly present in many other developing Asian economies. Different pathways are needed, matched to social and economic context. In particular, we examine the potential role of leading multi-national firms as agents of policy integration.

13. As we detail below, there are numerous opportunities in developing Asia to reduce the marginal cost of lowering the energy, materials, pollution and resource intensity of economic activity. Many – perhaps the majority - of these opportunities are not restricted to environmental performance per se. Thus credit mechanisms that allow manufacturers to upgrade production technology often yield environmental benefit even as the primary motivation is to reduce cost, or improve quality – this is the underlying premise of clean production. Privatization of capital starved state-owned facilities can lead to both improved economic competitiveness and improved environmental performance. Education programs that slow the rate of population growth reduce pressure on the natural environment. Fundamentally, policy integration seeks to reduce the economic and social cost of organizational and technological change that is driven by intensified pressure to improve environmental performance.

14. But first, we re-affirm the core characteristics of an effective system of environmental protection. For policy integration is ultimately a means to an end – toward implementing effective systems of environmental protection. Defined in this way, policy integration is a supplement to, not a substitute for, strong environmental policy. Policy integration creates the enabling context within which effective environmental policy reform can be rapidly and fully implemented within developing Asia. What is missing in Asia today is not so much good models of environmental policy as institutional frameworks within which such policy can be assured of effective adoption, and the political will necessary to sustain ongoing policy implementation.

II. Environmental Policy and Policy Integration

15. Our main purpose in this paper is to outline practical steps countries can take toward policy integration. It is helpful at this point in the paper, however, to restate the key elements of an effective environmental policy. Fortunately, the outlines of such environmental policy are already visible within the region today. While experts may debate the efficacy of particular policy tools, the main elements of effective environmental policy are reasonably clear – gathered from the experience of OECD countries and from first tier NIEs, and fine-tuned to the social and economic context of developing Asia. While many templates exist, we draw here upon that provided by Brown et al (2000).

16. Effective environmental policy begins with the adoption of aggressive performance goals and clear performance expectations that are consistently pursued and implemented. Typically these goals will be rooted in national environmental legislation. Such national legislation will authorize the establishment of a cabinet level environmental agency – such as the PRC's State Environmental Protection Administration, or Singapore's Ministry of Environment – that is charged with setting ambient environmental standards, and that has the capability to link achievement of these ambient standards to emissions limits for firms and industries. Typically emissions limits will be based on best available technology not entailing excessive costs (BATEEC standards). We know of no case of a country achieving substantial improvement in the environmental performance of industry without the presence of a strong national agency of environmental protection.

17. It is important to note in this regard that the goals of environmental protection now extend beyond the traditional focus on controlling pollution and other negative outputs of production. In addition to controlling these negative outputs, reducing environmental degradation also requires driving down energy, materials and resource intensity of economic activity – i.e. controlling resource inputs to production and consumption. Indeed, given the scale of increase in population, urbanization and economic activity predicted for developing Asia, addressing critical environmental challenges will likely require changes in technology, production processes and ways of living that go well beyond the improvements in pollution control and energy efficiency achieved within industrialized economies over the past two decades (Rock et al 2000).

18. Clear performance expectations require rigorous and consistent enforcement of emissions and ambient environmental standards. Whatever the level of a country's environmental performance goals – modest or ambitious – when environmental policy is unevenly and inconsistently applied this translates into unclear and uncertain messages concerning performance expectations, resulting in higher levels of malfeasance and erosion of benefit for leading firms. An important first step to influencing basic economic decision-making, therefore, is a national environmental

regulatory system that provides clear performance expectations that are consistently enforced. Consistent regulatory enforcement is a pre-requisite for widespread compliance with environmental standards and for the achievement of environmental performance goals. Effective enforcement requires policies, rules and resources, and a level of institutional 'reach' that stretches from the national to the regional and the local scale.

19. These same principles also hold for a broader set of institutions that impact resource use and environmental behavior, such as the functioning of the judiciary and the operation of property rights. The lack of secure, well-defined property rights in Asia provides perverse incentives for appropriation of those rights by either the State or well-connected individuals. The lack of secure property rights leads to under-investment in forest stewardship, misuse and inefficient allocation of scarce water, and over-fishing (ADB, 1997). Traditional, customary, or commercial property rights must be acknowledged and strengthened. State ownership may be needed to protect critical ecosystems that provide unique ecological services to a large number of people or endangered species, such as large watersheds or old growth forests. Assignment of private property rights may be the solution for other intensively used resources, such as issuing secure land titles to farmers with insecure ownership.

20. A second key characteristic of an effective system of environmental regulation is the adoption of appropriate policy tools. In the context of developing Asia, it is imperative that environmental regulatory institutions make use of policy tools that allow economic actors full flexibility in selecting cost efficient strategies for meeting environmental performance expectations. Typically this will involve some combination of ambient environmental standards, multi-media pollution control, pollution charges, resource pricing that reflects environmental cost, use of other market-based instruments such as emissions trading, as well as various forms of informal, private-law, and community-based regulation, such as public disclosure of environmental performance information and industry-wide voluntary certification. In some cases, flexibility will also be obtained through case-specific decision making – for example, allowing regulatory personnel some flexibility of response based on their knowledge of local circumstance. Firms will selectively combine end-of-pipe treatment with pollution prevention and clean production approaches based on the costs and opportunities presented in different sectors and industries.

21. Such a policy portfolio will represent a significant break from the past. To the extent that environmental policies have been pursued, these most often have comprised rigid, inefficient, and unimplementable measures weakly supported by ineffective environmental institutions without political backing. Among the more glaring obstacles to efficient response are contradictory cross-media policy effects (e.g. shifting the environmental burden from one media to another), failure to design policies for small and medium sized firms, technology lock-in to proscribed remedial technologies, policies that favor end-of-pipe control over improved production efficiency, attention to highly visible rather than most significant environmental problems, and subsidies for inefficient resource use. Much has been learnt over the

past three decades about ways to improve the efficiency of environmental policy – these lessons need now to be applied to the Asian development context with due attention to local capacity and situation.

22. Resource pricing is a critical element of the policy portfolio. Optimizing for both economic and environmental performance will not occur so long as resource prices fail to reflect environmental costs. Energy prices influence how efficiently a nation uses energy (Schipper, 1997). When energy prices are low relative to the price of capital and labor, technologies develop that are energy-using and labor-saving. Higher energy prices stimulate the development of more energy efficient technologies and where possible, the substitution of other inputs for energy. Just as stopping unaccounted loss of water (i.e. leakage and theft) from urban water supply systems may be the best investment for water utilities, eliminating perverse subsidies may be the best investment for governments. Industries are accustomed to paying market prices for inputs, but if they are able to access inputs at zero price, there is a strong incentive to substitute these inputs for those with a higher price. This is precisely what happens when ecosystem services, such as waste sinks (i.e. air, land, and water), have no markets. It is not that they have no value but rather the "owners" of those services (represented by the State) have not created a market, and therefore a price. The first step for governments is to conduct a comprehensive audit of all subsidies for energy and resource use and for pollution.

23. There are now good models in Asia Pacific of the application of pollution charges on resource use and pollution. Within urban areas, an efficient polluter-pays-approach to cost recovery typically will combine a broad-based pollution charge to all wastewater generators and a service fee to those connected to the wastewater system. A range of options exists for applying a broad-based pollution charge. For wastewater generators, the preferred approach is to charge for metered water consumption and collect this charge in combination with a water tariff. For example, in Metro Manila, all households connected to the water supply system pay a sewer surcharge added to their water bills.

24. A third key characteristic of an effective system of environmental regulation is a capacity to learn and adapt to change. As the experiences of the East Asian NIEs demonstrate, successful environmental regulatory agencies must be pragmatic, opportunistic, have flexibility of response, coordination across scales, the capacity to learn from experience, and to adapt to changing economic and political circumstance. This is especially important with respect to the selection and implementation of policy tools as clearly seen in the innovative use of community-based and informal systems of regulation in Indonesia and other developing Asian economies (World Bank 1999).

25. Fourthly, successful environmental regulatory systems are rich in information. Such information richness begins with standardized information on environmental performance – the bedrock of regulatory compliance. But information richness also extends to a broader set of economic, technological and social characteristics,

including the economic circumstance of firms, the track record of good faith behavior or of malfeasance, the availability of alternative production processes and technologies that offer environmental improvement at lower cost. Such information richness must also extend beyond the limits of the regulatory agencies themselves; it must be available to the public through public disclosure of environmental performance, and available to investors, customers and suppliers.

26. The question of concern here is the conditions under which such systems of effective environmental protection are likely to be implemented in developing Asia. Experience in much of Asia suggests that freestanding environmental agencies face substantial obstacles in building an effective system of environmental protection. Success likely requires the mainstreaming of environmental concerns within economic development policy. We now examine experience in East Asia with such policy integration.

III. Policy Integration in Practice: the experience of East Asia.

27. Over the past three decades, the first-tier East Asian NIEs, as well as selected second tier East Asian economies- have successfully strengthened their environmental regulatory systems, implementing tough environmental performance standards and investing in a strong centralized system of regulatory enforcement. Traditional command and control regulation has progressively been supplemented by a variety of second and third generation policy tools, such as pollution charges and other market-based instruments. The result of these efforts was a substantial reduction in pollution and improvements in ambient environmental quality. Significant improvements in air and water quality were achieved in Singapore (Rock, 2001b) and Taiwan, China (Rock, 1996). Malaysia (Rock, 2001a) was able to almost totally de-link pollution from production of its palm oil mills without undermining Malaysia's pre-eminent position in the world palm oil market. The PRC has begun to tackle elements of air pollution in its largest cities (Rock, forthcoming). All this was achieved under conditions of rapid urban industrial growth, suggesting that under the right circumstances and with the requisite resources and appropriate policy framework, the twin goals of improving economic prosperity and environmental protection can be achieved.

28. Our analysis of the implementation of strengthened systems of environmental protection in East Asia suggests that the creation of a powerful national environmental agency equipped with appropriate policy tools was a necessary but not sufficient condition of success. Success in East Asia in implementing improved systems of environmental protection also depended on three dimensions of policy integration: forging relations with the powerful state institutions of economic development, reducing abatement costs, and adoption of an information driven approach to promoting demand for environmental improvement. We now examine the experience of East Asian NIEs in these three areas – with the purpose of distilling lessons for other developing economies in Asia.

Working with Strong, Autonomous Economic Agencies:

29. In Singapore, Malaysia, and Taiwan, China governments recognized that environmental success depended on linking new environmental agencies with decision-makers in more powerful economic development and industrial promotion agencies. Close relations with those agencies proved critical to gaining support for environmental improvement in government and business and in identifying cost effective abatement options as well as opportunities for lowering the energy, water and material intensities of production. Without these relationships, it is not clear that the environmental agencies would have succeeded in implementing effective systems of environmental regulation. How this has been done varies quite significantly from economy to economy.

30. Singapore (Rock, 2001b) gave its environmental agency an important 'seat' at the industrial policy table by linking the promotional decisions of its investment promotion agency and the infrastructure decisions of its premier infrastructure agency to a requirement that firms receive support meet the environmental requirements of its environmental agency. Because of strong opposition from its industrial policy agency, the government of Taiwan (Rock, 1996) deliberately bypassed its premier industrial policy agency when it created a strong environmental agency. But by granting the environmental agency the legal authorities, technical capabilities, and the administrative discretion to impose sanctions on firms that failed to meet emissions standards, the government signaled to the industrial policy agency that it was serious about environmental clean up. This led the industrial policy agency to devise, with the government's consent, its own environmental program. Malaysia's weaker environmental agency relied on close relations with firms in the Crude Palm Oil (CPO) industry, a powerful industry association, and a prominent oil palm research institute to clean up CPO wastewater emissions (Rock, 2001a).

31. Singapore's (Rock, 2001b) decision to elevate its environmental agency to co-equal status with its industrial promotion agency and its premier infrastructure agency reflected a decision to build the economy as a clean and green first world oasis for multinationals in Southeast Asia. As is well known, the country's Economic Development Board (EDB) scoured the world for industries and firms it wanted to attract. It offered promotional privileges—typically tax holidays, accelerated depreciation allowances and access to space in one of the country's premier industrial estates administered by the Jurong Town Corporation (JTC)—to get firms in particular industries to locate in Singapore. But before promotional privileges were granted by the EDB and space allocated by the JTC, the Ministry of the Environment (ENV) had to approve each firm's production process and its plan to abate pollution to meet the country's tough emissions standards. Occasionally the ENV rejected a particular industry as too polluting, more frequently it worked closely with these firms to identify cost effective treatment technologies. The ENV also worked with the JTC to locate the most polluting industries farthest from residential and

commercial populations. The ENV helped the JTC to shrink the geographic distribution of hazardous activities and to co-locate similar activities with similar waste streams in the same locations. This facilitated several common solutions to pollution problems.

32. Malaysia's (Rock, 2001a) decision to link its environmental agency, the Department of the Environment, with CPO mills, a CPO industry association, and an oil palm research institute, PORIM—the Palm Oil Research Institute of Malaysia—reflected a political reality that CPO mills could not be shutdown without undermining the government's most successful rural anti-poverty program. This program managed by FELDA, the Federal Land Development Authority, developed new small-farmer palm oil farms complete with infrastructure clustered around larger palm oil estates and CPO mills. Following race riots in 1969 and subsequent announcement of Malaysia's New Economic Policy, which was designed to reduce poverty among rural ethnic Malays, both private financed and FELDA financed oil palm production schemes and CPO production grew exponentially as Malaysia captured a large share of the world CPO market. But this came at substantial environmental cost as CPO wastes soon clogged a large number of the country's major rivers. Trapped between the economic success of its small-farmer oil palm schemes and growing complaints about CPO wastes from rural ethnic Malays, the government set about on a pragmatic search for cost effective treatment technologies. Once these technologies were identified by PORIM and evidence accumulated that CPO mills were adopting these treatment technologies without undermining profitability or exports in the industry, the Department of the Environment (DOE) imposed emissions standards and ratcheted them up over time as more cost effective treatment technologies emerged. The result was an effective delinking of pollution from the scale of palm oil production and export.

33. The government in Taiwan, China (Rock, 1996) followed a third pathway to linking its environmental regulatory agency to its powerful industrial policy agency. Because its premier industrial policy agency, the Industrial Development Bureau (IDB) in the Ministry of Economic Affairs opposed environmental clean up, fearing it would undermine the profitability of industry at a time industry was being 'hollowed out' by rising wage rates and an appreciating currency, the government's environmental program initially bypassed the IDB. Once the environmental agency began imposing sanctions on polluters, the IDB realized that it needed to develop its own environmental strategy. This led it to develop a joint pollution prevention waste minimization program with the Taiwan Environmental Protection Agency that worked. It led the IDB to offer promotional privileges to firms for the purchase of pollution control equipment. The IDB also used its promotional privileges to foster development of an indigenous environmental goods and services industry that it expected to become export-oriented. In fact, as has been typical of the IDB's export promotion programs, it set quantitative export targets for this industry and appears to have conditioned access to promotional privileges to the meeting of those targets. And most intriguingly, the IDB invested in creation of a state of the art research program on the energy, water, materials and pollution intensities of Taiwanese

industries in the Industrial Technology Research Institute (ITRI), the premier science and technology institute in Taiwan.

34. Linking new environmental agencies with more powerful economic development and industrial policy agencies in East Asia helped gain critical support for environmental improvement within government and from business. It fostered trust and confidence between environmental agencies, economic development and industrial policy agencies and the business community over a shared need to clean up the environment without imposing costs on firms that endangered their profitability, growth, and export potential. The involvement of economic development agencies was a powerful sign to the business community as to the seriousness of the government's commitment to the goal of environmental improvement, as well as to the commitment to finding solutions that did not impose unreasonable costs on firms and industries. Experience with particular policy tools, such as progressively phasing in stricter emissions requirements based on advances in best available technologies that do not involve excessive costs, built confidence that environmental improvement and strengthened economic performance were goals that could be jointly pursued.

Lowering Abatement Costs

35. Another key benefit obtained by linking environmental protection agencies and development agencies relates to lowering abatement costs. Inter-agency cooperation facilitated access to important information about the costs of abatement and the impact of those costs on profitability and the ability of regulated firms to export. Most importantly, it facilitated joint searches for cost effective abatement technologies and for ways to reduce pollution intensities and intensities of use of energy, water, and materials. Reducing abatement costs and energy, material, water and pollution intensities were and are particularly important to firms and governments in East Asia. This is because both were convinced that environmental improvement could not come at the expense of poverty reduction, increasing incomes, diversifying economies, expanding export bases and upgrading the technical capabilities of indigenous firms in these economies

36. Governments in the first tier East Asian economies, most particularly Singapore, Malaysia, and Taiwan, China found various ways to reduce the costs of abatement. In the early days, Singapore's Ministry of the Environment (ENV) invested heavily in a worldwide search for the most cost-effective abatement technologies (Rock, 2001b). This empowered the ENV by making it acutely aware of best available treatment technologies not entailing excessive costs (BATEEC). Because many of the promoted firms in Singapore had little experience with pollution control, the ENV used this information to develop lists of reputable environmental goods and services providers that it shared with promoted firms. This reduced information barriers for those firms and eased their transition to less polluting technologies. Over time, the ENV got tougher by asking firms seeking promotional privileges if they planned to use cleaner technologies, whether they were willing to substitute materials use to reduce the toxic intensity of production, and how they planned to reduce water use in the face of Singapore's freshwater scarcity. Because the ENV was knowledgeable

about international best practices and had intimate relations with promoted firms, it was able to help the firms lower abatement costs and lower energy, water, materials and pollution intensities.

37. As mentioned earlier, the DOE in Malaysia invested heavily in a worldwide search for best available treatment technologies not entailing excessive costs for treating CPO wastes. Finding none, it worked closely with PORIM to develop such a treatment technology that worked. Once identified, the DOE used its relationships with PORIM and the CPO industry to track adoption of the new treatment technology. Once it became clear that the treatment technology worked without undermining the profitability and export potential of the CPO industry, the DOE ratcheted up emissions standards, ultimately de-linking CPO production and exports from CPO wastes (Rock, 2001a).

38. The government in Taiwan, China (Rock, 1996) vested authority for identifying cost minimizing treatment technologies, for lowering the costs of abatement, and for reducing the energy, water, materials and pollution intensities of production to the IDB. As in Singapore and Malaysia, the IDB invested in information gathering about the costs of alternative treatment technologies for the firms and industries it promoted. It also invested in a practical joint program with the TEPA in pollution prevention and waste minimization. This included co-locating similar SMEs in industrial parks and empowering SMEs in those estates to jointly manage pollution reduction. But the IDB went well beyond these activities. It subsidized the purchase of pollution control equipment by offering tax reductions and accelerated depreciation allowances and access to subsidized for purchase of pollution control equipment. Because the IDB ultimately came to see development of an indigenous environmental goods and services industry as one of the next steps in its promotional strategy, it subsidized the creation of an indigenous environmental goods and services industry that it expected to become export oriented. And it engaged in state of the art research on the energy, water, materials, and pollution intensities of Taiwan's industries that included benchmarking performance against international best practices.

39. Why has (and is) the IDB done (doing) all these things? Four different kinds of economic developments predominate. Appreciation of the exchange rate, rising wage rates, and emerging labor shortages alongside increased demands for a cleaner environment contributed to an export of industry during the 1980s. Many of the firms that migrated to the PRC and Vietnam, among other places, were in industries—textiles, leather goods, and metal and electro-plating industries—considered by the IDB to be excessively dirty or polluting. On the other hand, the new high-tech industries promoted under the new Statute for Upgrading Industries are considered relatively clean. Said another way, the latest competitive shift in industrial structure is away from industries with high pollution intensities toward industries with low pollution, or at least lower, intensities. Industrial policy, what the IDB does best, just sped and speeds this process.

40. Secondly, the Taiwanese expect the demand for environmental goods and services in Southeast Asia to grow rapidly over the next several years. They are preparing to

capture a substantial share of this market. They see this as part of the next step up the industrial ladder and an important way Taiwan, China can distinguish itself in the region. Some in the IDB see it as a part of the way Taiwan, China can establish itself as an Asia-Pacific Regional Manufacturing Center in the region's vertical system of division of labor. The National Cleaner Production Center in ITRI financed by the IDB has contributed to this by establishing an Asian network for clean production.

41. Finally, the IDB views its approach to industrial pollution control and reduction as more cost effective than the alternatives. They accept that tough emission/effluent standards and equally tough enforcement are necessary to get firms to accept protecting the environment as part of the cost of doing business in a highly competitive global economy. But, they believe, equally strongly, that the IDB's fiscal and financial incentives can quicken the shift to a less polluting industrial growth strategy. And they know, from direct experience, that pollution prevention sometimes pays.

Information, Public Disclosure, and Performance Standards

42. Each of the regulatory agencies in the first tier NIEs routinely relied (and rely) heavily on information and disclosure based environmental improvement strategies. Long term, medium term and short-term ambient environmental goals for air, water, and land were (and are) set to both drive performance and to communicate to the public progress made. Similarly, short term, medium term and long term emissions standards were (and are) set to drive performance of firms and to report to the public the degree to which industry was complying with quantitative standards. In both instances, initial standards have been well below international best practice. This reflects the highly practical step-at-a-time process used to achieve improved environmental outcomes in East Asia. It also enables those in regulatory agencies to learn about the difficulties associated with meeting quantitative environmental goals. While initial standards have been relatively easy to achieve, regulatory agencies also communicated to regulated firms that both ambient and emissions standards would be tightened over time.

43. Sometimes quantitative standards were set for the intensity of use of water or energy at the firm, sector and economy level. Because Singapore is extremely short of freshwater and heavily dependent on Malaysia for its freshwater supplies, the government has taken great care to protect freshwater supplies. It not only invested heavily in protecting freshwater supplies but the EDB provides promotional privileges in the form of accelerated depreciation to firms that invest in water saving or water recycling technologies (Rock, 2001b). To be eligible for these benefits, firms have to demonstrate that water saving/recycling technologies use less water than more conventional production and abatement technologies. The PRC, particularly north China, like Singapore is also short of fresh-water. Because of this, the national environmental agency has included an intensity of water use indicator (wastewater discharged per RMB 10,000 of industrial output) in its public disclosure program that annually rates, ranks, and discloses the environmental performance of

the country's major cities (Rock, Yu and Zhang, 1999). To date, the industrial policy agencies in Taiwan, China have the most extensive experience in the region with intensity of use indicators. There the IDB has contracted out state of the art research to ITRI on the energy, water, materials and pollution intensity of particular industries in Taiwan (Rock, 1996). In several instances, as in wafer fabrication, water use per wafer in Taiwan has been bench-marked against international best practice.

44. But the most developed use of information and disclosure to achieve environmental improvement in East Asia occurs in the PRC. Since 1989, China's State Environmental Protection Administration (SEPA) has been working closely with city-level Environmental Protection Bureaus to annually rate, rank, and disclose the environmental performance of the country's major cities (Rock, forthcoming). SEPA's Urban Environmental Quantitative Examination System (UEQES) is one of eight environmental policy instruments used by SEPA to reduce pollution. Assessment of a city's environmental performance is based on a city's composite score on some twenty plus environmental indicators. Some of those indicators focus on ambient environmental quality. Some focus on the level of development in urban environmental infrastructure and some focus on indicators of urban environmental management (pollution control). Scores on each indicator are weighted and summed to yield a composite score. Cities are ranked on the basis of their composite scores and SEPA publishes ranks and scores in its annual environmental yearbook. Some provinces and cities have followed this practice by publicizing scores and rankings in newspapers and on radio and television.

45. How has the UEQES process affected environmental management within cities? This question was answered by interviewing officials in five city-level Environmental Protection Bureaus (EPBs). Prior to the initiation of the UEQES, environmental officials in these cities stated they had a difficult time getting the attention of either mayors or of those in powerful economic agencies. Subsequent to the disclosure of cities' scores and ranks on the UEQES, this began to change. Senior officials in every EPB interviewed stated that over time, the UEQES captured the attention of mayors. Mayors wanted to know why their city scored and ranked lower than other cities. They wanted to know what was in the index and how it worked. They also wanted to know what could be done to increase a city's score and rank and they wanted to know what this would cost.

46. The annual UEQES examination process provided city-level EPBs with their first real opportunity to engage with more powerful economic agencies over environmental issues. How this works is best demonstrated by describing the process used to implement the UEQES. To begin with, every major city in the PRC has a five-year plan and an annual plan for improving the environment. Production and implementation of these plans are under the authority of a city's Environmental Protection Commission (EPC). Normally, the chairperson of the EPC is either the mayor or a vice-mayor. Other members of the EPC come from the city's Economic Commission, its Industrial Bureaus, its Finance Bureau, its Tax Bureau, its Urban Construction Bureau, and several others. Implementation of the UEQES process is

led by the EPC, but the local EPB serves as the key technical office. The process begins when the mayor asks each line agency and sector/district within a city to put together a report that evaluates their performance relative to last year's environmental targets and proposes environmental targets for the current year. The EPB takes this information, analyzes it, consults with appropriate line agencies, sectors, and districts and rolls this up into a projected overall target score on the UEQES that is included in a background report that the EPB prepares for the EPC early each year. The background document describes what the city did to improve its score last year, identifies the major environmental problems in the city, proposes targets by indicator for the current year, and assigns responsibility for meeting those targets to the appropriate line agencies.

47. Following submission of the background report, the EPC holds a meeting on the UEQES. At this meeting, the EPC reviews past progress, examines current environmental problems, agrees on this year's target score for the UEQES, and assigns responsibility for meeting targets to specific line agencies, sectors, and districts. This meeting culminates in the signing of environmental target responsibility system contracts between each sector of government and the mayor. These serve as the basis of the mayor's environmental target responsibility contract with the provincial governor. During the year, senior representatives of the EPB meet approximately two times with each line agency in city-government to evaluate their performance relative to targets. The results of these meetings are rolled up into mid-year and end-of-year EPC reviews of progress by line agency, sector, and district. The EPB prepares background reports for these reviews.

48. Evidence gathered in several cities suggests that the UEQES process is making an environmental difference. One example is cited here, others can be found in Rock, Yu and Zhang (1999). In Tianjin the local EPB used the UEQES to reduce TSP levels in the city. In the 1980s, TSP levels averaged about 500 mg/m^3 in the city, today they are about 300 mg/m^3. Officials in the Tianjin EPB attribute the decline in TSP levels to an increase in the percent of households using briquettes and gas for home cooking, the percent of households heating with centralized heating, and the percent of major boilers in the city that have installed scrubbers. Officials in the Tianjin EPB attributed each of these increases to the implementation of the UEQES examination process.

49. This was accomplished by using a bottom-up planning process to set target TSP concentration levels in each of the city's 18 districts/counties. This process took account of how many households were in a district/county, what percent of the households cooked with briquettes and gas, what percent heated with central heat, how many industrial boilers operated in a district/county and what percent of those installed and used scrubbers. Following completion of this inventory, each district/country developed estimates, in conjunction with others of what it would cost to extend household use of briquettes, gas and central heat, and what it would cost to install scrubbers on boilers. After making several assumptions about how much expansion in each area could be financed by the city in any year, the city developed

annual and five-year targets for each of these UEQES parameters. The local EPB used targets for these parameters to set new targets for TSP concentration levels within the city. These were set at no more than 250 mg/m^3 for counties, 310 mg/m^3 for the six dirtiest urban districts in the city, and 250-310 mg/m^3 for the remaining urban districts.

50. Once these new targets were agreed to, the EPB used its real time monitoring of TSP in each district/county to track performance relative to target each year. When performance in a district fell below the target, the EPB worked with the district level EPB to figure out why. As officials from the EPB stated, often failure to meet a target could be pinpointed to one plant. The EPB would then negotiate with the Industrial Bureau that had authority for the plant over how the plant would go about reducing its emissions so that the city could meet its TSP target. In difficult cases, EPB officials called on the mayor, the EPC, or the Personnel Department for the city for help.

51. There appear to be several reasons why this process worked. To begin with SEPA and city-level EPBs tethered the UEQES to an environmental target responsibility system used by provincial governors to hold mayors accountable for the environmental performance of cities. Disclosure of a mayor's performance relative to his contract with the provincial governor alongside disclosure of the ranking of his city by SEPA have been sufficient get mayors to take steps to meet contract requirements and improve scores on the UEQES. In addition, both SEPA and city-level EPBs learned how to integrate environmental consideration into economic policy-making by taking advantage of a bargaining model of policy implementation used by cities to make economic and environmental decisions.

IV. Designing and Implementing Policy Integration Programs

52. The experiences of Singapore, Taiwan, China, Malaysia and the PRC demonstrate that policy integration is practically possible and that it works. The advantages of developing environmental policy through policy integration as opposed to through stand-alone environmental agencies acting alone are clear. Policy integration fosters critical mutual trust and support for environmental improvement in economic development and industrial policy agencies as well as within the private sector. Without this support, stand-alone environmental agencies have little chance of succeeding. It provides regulatory agencies with inside information on the costs of abatement and on the costs of reducing the energy, water, materials, and pollution intensities of economic activity. This facilitates joint searches for least cost solutions to environmental problems, frees regulatory agencies from having to use the most blunt instruments to gain compliance, and it makes regulatory agencies sensitive to the needs of balancing environmental improvement with the other goals of development. When tethered to the use of information to evaluate and disclose performance, it strengthens public support for environmental improvement.

53. There are several reasons governments in each of these economies have been so successful at policy integration. To begin with, each of the policy integration programs described earlier had the commitment and support of key decision-makers and top political leaders. Environmental improvement was a high priority of the Prime Minister of Singapore (Rock, 2001b). Unwavering commitment from the Prime Minister meant that those in industrial policy agencies knew that economic growth could not come at too high a cost to the environment while those in the regulatory agency knew that environmental improvement could not come at the expense of economic growth. This chastened both to search for least cost solutions to pollution. Promoted firms were willing to abate pollution because they knew it would not come at too high a cost and because Singapore offered many other advantages—an excellent infrastructure, low wages and a hard working labor force, and a superb location astride one of the world's busiest shipping lanes.

54. Something similar was at work in Taiwan, China, Malaysia and the PRC. Faced with an environmental protest movement following democratization and a willingness of opposition parties to blame the ruling party for environmental degradation in Taiwan, the top leadership of the ruling party committed itself to environmental improvement Rock, 1996). This unwavering commitment was signaled by creation of a highly capable and tough regulatory agency that was given broad authority to sanction firms failing to meet emissions standards. This signaled to the IDB that the government was serious about cleaning up pollution forcing the IDB to seek an alliance with the regulatory agency (in pollution prevention) and to launch its own substantial environmental program. By astutely recognizing that it could use its promotional privileges to lower abatement costs and the costs of reducing energy, water, materials and pollution intensities, the IDB signaled to both the environmental agency and the private sector that it had an important role to play in environmental improvement.

55. In Malaysia, unwavering commitment of the government to a rural anti-poverty program based on oil palm production and exports meant the environmental agency could not reduce CPO pollution if it undermined the profits and exports of the CPO industry. But because of growing protests over CPO pollution from rural Malays, a vital political constituency for the ruling Malay party, neither the government, nor the private sector, or the environmental agency could ignore the environmental costs of CPO production (Rock, 2001a). This forced the environmental agency, the CPO industry, and a palm oil research institute to build relationships with each other and engage in a joint search for a least cost solution to pollution. In the PRC, the regulatory agency capitalized on an environmental responsibility system that required mayors to sign environmental performance contracts with provincial governors (Rock, forthcoming). This captured the attention and sustained the commitment of mayors to the agency's city-level environmental rating, ranking and disclosure program. But as in Singapore, Malaysia, and Taiwan, China environmental regulators also knew that environmental improvement could not come at too high an economic cost to cities and mayors. Because of this, they linked real practical environmental improvements to a consultative process that engaged economic development agencies, industrial bureaus, finance agencies, and banks in jointly

optimizing environmental and economic improvement. This forced all involved to search for least cost solutions to pollution.

56. Commitment of key policy-makers and top political leaders went hand in hand with merit based and goal driven bureaucracies, negotiated consensus building decision-making processes, and an ability to integrate environmental considerations into the unique decision-making structures and institutions used to guide economic and industrial growth in each of these economies. Bureaucrats in city governments, environmental, economic development, and industrial policy agencies were first and foremost highly trained goal oriented pragmatic problem solvers. They possessed substantial independence or autonomy from organized interests in civil society, including business interests. This autonomy made it possible for those in government to devise and implement trial and error step-by-step environmental programs and policies to solve real practical pollution problems.

57. Government officials in these economies also benefited from what Evans (1995) labels embedded autonomy—or autonomy based on institutionalized channels of communication with the private sector. Those channels facilitated information gathering that helped lower the costs of abatement while promoting the development of mutual trust. Because policy-making in East Asia requires negotiated consensus in which no one or no agency 'loses face', both regulators and industrial promoters tended to compromise by searching for and agreeing on least cost solutions to pollution. Finally, environmental agencies, economic development agencies, and industrial policy agencies found ways to integrate environmental considerations into well-established decision-making processes governing economic and industrial development.

58. Except for Singapore, those in regulatory and other government agencies committed to environmental improvement also took advantage of growing public criticism of 'grow first clean up later' environmental strategies. But how they did so varied. Some times, as in Malaysia, regulatory agencies crack downed on polluters following highly publicized pollution incidents that strengthened their hand at the expense of firms and economic agencies who wanted a more go slow approach to environmental improvement (Rock, 2001b). Sometimes, as in Taiwan, China regulatory agencies used relationships with part of the public (academics, research institutes, and NGOs) over a new issue (environmental cleanup) to good effect by engaging the public in ambient and environmental standard setting and in environmental impact assessments for large projects (Rock, 1996). And sometimes, as in the PRC and Taiwan, China regulatory agencies channeled public complaints through citizen 'hotlines' to strengthen their hands against those proposing a more go slow approach to environmental cleanup and to demonstrate to others (mayors and other government officials) that they were responding to citizen complaints (Rock, forthcoming).

59. Unwavering leadership commitment to environmental cleanup, merit-based and goal driven bureaucracies with embedded autonomy, opportunistic behavior on the part of regulators, and integration of environmental considerations into the institutions of

industrial policy proved to be a particularly potent mix to drive environmental improvement in the first tier newly industrializing economies (NIEs) of East Asia. Unfortunately, many of these elements appear to be lacking in most of the rest of Asia. There is little evidence that top leaders in most of the rest of Asia are committed to environmental improvement. Public sector bureaucracies in much of the rest of Asia tend not be as merit-based, pragmatic or goal driven as they are in the first tier East Asian NIEs, including the PRC. To make matters worse, those bureaucracies have substantially less technical capacity and less embedded autonomy, particularly from business, and they are fraught with more or less patron-client ties that reinforce rent-seeking rather than development oriented behaviors. This is particularly true of industrial policy agencies such as ministries of industry, boards of investment, and public sector science and technology institutes. Because of this, reformers in government, particularly economists, with support from the World Bank and the International Monetary Fund, are hard at work dismantling the traditional selective instruments and institutions of industrial policy in these economies. Trade regimes are being liberalized, subsidized directed credit programs are or have been largely dismantled, lists of promoted industries are being whittled down, and promotional privileges are being discarded in favor of simple market-driven outcomes.

60. This might lead some to conclude that there are few opportunities, if any, for driving environmental improvement in any of these economies until and unless underlying conditions become more favorable. We believe this conclusion is unwarranted. As our experience in China has demonstrated, even when national level considerations look unfavorable there may be real opportunities to engage in local environmental improvement. This is particularly clear in the case of the PRC's city-level environmental rating, ranking, and public disclosure program. Conditions for success are greater in the PRC's larger, richer, coastal cities than it is in smaller, poorer, inland cities. Mayors in these cities are more committed to environmental improvement, public pressure is greater, and bureaucracies are stronger, technically more sophisticated, and more goal driven. Not surprisingly, the larger, richer, coastal cities have made much more environmental progress than the smaller, poorer, inland cities. It also appears to be true of the PRC's water pollution levy. Richer provinces appear to have used the levy to affect the polluting behavior of firms, while poorer provinces have been less prone to do so (Wang and Wheeler, 1999).

61. Something similar has happened in Indonesia where a progressive mayor in a relatively large and rich coastal city took advantage of a highly publicized pollution incident to implement a city level monitoring and inspections program of major industrial facilities within the city (Aden and Rock, 1999). This occurred against the backdrop of a weak national environmental agency that has had relatively little success in improving ambient environmental quality. But even this weak national agency was able to garner enough high level political support, including from the president, to design and implement a unique public disclosure program that monitored and disclosed, through a simple color coding system, the environmental performance of major industrial water polluters (Afsah and Vincent, 2000). What all this means,

is that external attempts to support policy integration have to be based on local level knowledge of where the best opportunities for intervention lay. This suggests the need for strong local partners and for highly targeted reconnaissance missions in individual economies. Such missions should focus on identifying local policy integration 'champions', identifying stakeholders in environmental, economic development, and industrial policy agencies who might be willing to engage in environmental improvement, and assessing the extent to which public pressure can be used to move things along. This might start by looking at the national picture, moving down to provincial and city level conditions in one or more provinces or cities. But it also requires looking at other potential opportunities such as focusing on particular locales that are 'hot-spots' that have attracted the requisite attention and support. Or it might involve working with others, such as industrial estate authorities, that are being pressed by local power holders, NGOs, and/or local communities to clean up pollution emanating from particular estates. While opportunities for policy integration will vary from economy to economy and from place to place, the central message is clear—build relationships with like-minded local partners and engage in highly targeted reconnaissance missions that enable one to seize real targets of opportunity.

62. Because governments and government agencies in most of the rest of Asia are not as strong, capable, and goal driven as their counterparts in the first tier East Asian NIEs, policy integration will have to be less government centered than it is in the first tier East Asian NIEs. The alternative is to center policy integration on and in firms and their problems. The question this raises is what might less able and less autonomous government agencies do in this regard that does not overtax their capacity to design and implement new policies or open them to too much rent-seeking? Since the central problem facing many of the firms in the rest of Asia is increasing the capability of firms to import, adapt, and innovate on an increasingly sophisticated capital stock developed elsewhere, the most obvious point of entry is linking general capabilities upgrading within firms with environmental capabilities building.

63. In the first tier East Asian NIEs, capabilities building within firms required substantial investments in engineering education, an incentive system that rewarded firms who learned how to upgrade, and assistance to indigenous firms when they had difficulty getting their first world joint venture partners to invest in technical upgrading of local firms. Several of the governments in the rest of Asia, particularly Indonesia and Thailand, are hard at working expanding public investments in engineering education, including environmental engineering education. As in the first tier East Asian NIEs, governments in several of the other economies in Asia, particularly Indonesia, Thailand, the Philippines and the PRC, are rewarding firms for their ability to upgrade their capabilities. In each instance, export performance is used as a simple proxy for the ability of firms to engage in high-speed technical learning, particularly as firms move from low-skill labor intensive and processed raw material exports to increasingly skill intensive exports. Since it is relatively easy to measure export success, using it as a proxy for success in upgrading capabilities might be one way to limit demands on policy implementers for policy design and

implementation of a firm centered environmental improvement strategy. If rewards for export success were allocated in an open and transparent way, it just might also reign in rent-seekers.

64. Some of these governments, particularly Indonesia and Thailand, also help indigenous firms in struggles over technical upgrading with first world joint venture partners (Rock, 1995, 1999 and 2000). Some times they do this by increasing local content requirements. Sometimes they do it by requiring first world firms to reduce their holdings of their junior partner's equity shares. There are several examples in Indonesia and Thailand where this has facilitated more technical upgrading. These examples suggest that governments may be less prone to rent-seeking than conventional wisdom suggests (Rock, 2000).

65. Perhaps the greatest opportunity for a firm centered approach to policy integration is in the area of small and medium sized enterprises. In many parts of developing Asia, small and medium sized enterprises are the largest source of industrial pollution. These SMEs often operate below the radar-scope of national regulatory authorities and avoid effective environmental regulation. At the same time, much of the cause of poor environmental performance lies in the limited technical, financial and managerial capabilities of these firms. Firm centered approaches to policy integration address critical needs for investment in credit financing, tax depreciation of capital investments, managerial training, and technological upgrading – all of which typically yield economic and environmental benefit. The challenge of traditional clean production programs for small firms is how to reach the multitude of firms involved, many of which may be unregistered. Policy integration extends the range of organizations at the national, regional and local scale with responsibility and capability for improving economic and environmental performance.

66. At the other end of the size spectrum, policy integration suggests opportunities for addressing environmental performance for very large state-owned firms. Where state-ownership has resulted in capital-starved facilities with little opportunity for innovation and little exposure to external performance drivers, privatization may promote improvements in both economic and environmental efficiency. By way of example, the PRC has closed down thousands of sub-optimal polluting pulp and paper mills, with significant environmental outcomes.

67. The main advantage of this strategy is that it links environmental improvement to one of the most pressing economic development problems—capabilities building of indigenous firms— governments and firms in the rest of Asia face. Since environmental improvement policies have greater chances of success when they are linked to real world development problems, such a strategy appears to be particularly attractive. But how precisely might environmental improvement be linked to capabilities building within both large and small firms? It might involve building relationships with leading firms who can take the lead in environmental change. It might involve working with leading industry associations who also might take the

lead in managing environmental change. Or it might involve working with leading firms and the local small and medium-sized firms that supply leading firms.

V. Policy Integration Restated.

66. If the current driving forces of change in developing Asia continue unabated without effective policy response, then environmental degradation will become an increasing constraint on economic growth and upon efforts to eliminate severe poverty within the region. Thankfully such a 'business as usual' scenario is not the most likely future for the region. Based on the experience of OECD and other higher income economies, it is more likely that mounting environmental and social pressures will force a policy response – albeit delayed - that will bring societal goals of environmental quality and economic growth into closer alignment. Over the next two decades, additional resources will most likely be committed to environmental protection and to resource management. Under conditions of economic growth, the more immediate environmental problems within the region likely will be partially addressed as public pressure for environmental improvement mounts and as the resources available for investment increase under conditions of improving socio-economic welfare.

67. In this context, the critical policy question is whether there is a way to achieve such a transition at lower overall economic cost and in ways that minimize the human toll that will accompany a delayed, uncoordinated and partial policy response. Our primary concern in this paper is with *how* a transition in the relationship of economic development and the environment can be managed to reduce overall economic and social cost. Our focus is not so much on environmental policy per se as upon tools for integrating environmental and economic policy – creating a framework of policy integration that facilitates the pursuit of environmental goals in ways that are consistent with other societal goals, specifically reducing poverty and supporting economic growth.

68. The preceding sections of this paper have laid out a framework of policy integration directed toward the co-optimization of economic and environmental performance. The ultimate goals of this policy approach are reducing poverty and environmental degradation within developing Asia. The scale and scope of change required are very large. Much of developing Asia is in the midst – not at the end – of an urban-industrial transition of unprecedented scale and intensity. Achieving requisite reductions in the energy, materials, and pollution intensity of economic activity requires widely ranging changes in product and process technologies, patterns of production and ways of living. Such change will not occur absent the maintenance of a broad based constituency for reform, and absent the creation of effective and durable institutions of change. Ultimately good governance is the bedrock of policy integration.

69. Our analysis focused on the experience of the East Asian NIEs in utilizing policy integration to secure reductions in industrial pollution. We identified four aspects of the practice of policy integration in East Asia that contributed to success in reducing pollution: harnessing the capacity of strong institutions, such as ministries of industry and finance, to the task of pollution reduction; reducing abatement costs through the identification of best available technologies that do not entail unmanageable cost; effective, results-oriented leadership within government institutions; and an information-centered approach toward strengthening non-regulatory drivers of environmental performance, and more generally, public support for the pursuit of environmental improvement alongside other societal goals.

70. The success of policy integration among the East Asia NIEs was under-girded by a broader set of supportive conditions, including strong, goal driven government agencies with embedded autonomy, a commitment to environmental improvement on the part of the highest level of government leadership, and increasingly forceful public criticism of past and present failures to protect the environment and public health. More generally, the demonstrated success of the East Asian NIEs in improving simultaneously economic and environmental performance weakened the case of critics arguing for a continuation of 'grow now and clean up later' policies.

71. These broader enabling conditions are to varying degrees absent in much of the rest of Asia, especially among the poorest economies. Many lower income economies in Asia lack the resources, institutional capability, political will, and public support necessary to pursue a successful strategy of policy integration toward addressing environmental concerns. Under these circumstances, our analysis recommends two broad strategies. In the near term, policy integration can usefully focus on firms and upon the task of upgrading the organizational and technical capability of firms to import, use and innovate upon technologies that are less energy, materials and pollution intensive. Over the medium term, investment in an information-centered approach to strengthening non-regulatory drivers of environmental performance will be critical, including programs of education, public disclosure of environmental information, and transparency of public decision-making.

72. Given the likely trajectory of population growth, urbanization, industrialization, and attendant increases in production and consumption within Asia over the next two decades, driving down the energy, materials and pollution intensity of economic activity is a critical policy priority. Absent new policy initiatives, environmental degradation is likely to emerge as a substantial constraint on future economic growth and upon efforts to reduce severe poverty within the region. Policy integration offers a framework within which the twin goals of environmental improvement and reducing poverty can be successfully co-optimized, helping to strengthen systems of environmental protection throughout the region.

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